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General Office: 772 Horizon Drive, Grand Junction, CO 81501 (303) 245-5460
Corporate Office: 212 West Michigan Avenue, Jackson, MI 49201 (517) 788-1942
Registered Office: 136 South Main, Salt Lake City, UT 84101 (801) 534-0734
Shootaring Canyon Operations: P. O. Box 511, Ticaboo, UT 84734 (801) 788-2120
Mill Office

September 18, 1984

Ms. Pamela Grubaugh-Littig
Utah Division of Oil, Gas and Mining
4241 State Office Building
Salt Lake City, UT 84114

Re: Surety Estimates

Dear Ms. Grubaugh-Littig:

Enclosed please find copies of the following documents that you requested in our telephone conversation yesterday:

Decommissioning and Reclamation Plan, Shootaring Canyon Processing Facility, January 1982

Letter to USNRC dated May 17, 1982, with attachments

Letter to USNRC dated April 11, 1983, with attachments

Letter to USNRC dated April 12, 1983, with attachments

Letter to USNRC dated June 20, 1983, with attachments

If you have any questions, please call me at (801) 788-2120.

Sincerely,

Fred W. Gerdeman

Fred W. Gerdeman,
Director of Regulatory Affairs

FWG:bim

enclosures

cc: Jay Germankin, Giauque & Williams

plateau resources
LIMITED

General Office: 772 Horizon Drive, Grand Junction, CO 81501 (303) 245-5460
Corporate Office: 212 West Michigan Avenue, Jackson, MI 49201 (517) 788-1942
Registered Office: 136 South Main, Salt Lake City, UT 84101 (801) 534-0734

June 20, 1983

U. S. Nuclear Regulatory Commission
Uranium Recovery Field Office
Attn: Mr. R. Dale Smith
P. O. Box 25325
Denver, Colorado 80225

Reference: Revision to Interim Surety Estimates for Decommissioning and Reclamation, April 1983 (SUA-1371, Docket No. 40-8698)

Gentlemen:

In a recent telephone conversation with Mr. Terry L. Johnson of your staff he asked for clarification regarding some calculations that were made in our submittal entitled Interim Surety Estimates for Decommissioning and Reclamation for the Shootaring Canyon Processing Facility. After reviewing the calculations, I indeed found that a footnote on page 4 gave an incorrect inflation factor. Therefore, enclosed please find a revised page 4 which gives the corrected inflation factor.

Sincerely,

Fred W. Gerdeman

Fred W. Gerdeman
Governmental Affairs Supervisor

FWG/ksd

Enc.

cc: Mr. Terry L. Johnson

LIST OF REVISIONS

Revision Date	Remove Old Pages	Insert New Pages
4/12/83	N/A	List of Revisions
4/12/83	1	1
6/16/83	List of Revisions(4/12/83)	List of Revisions*
6/16/83	4	4*

*Attached.

DECOMMISSIONING/RECLAMATION COST ESTIMATE

SUMMMARY

TASK DESCRIPTION	ESTIMATED COSTS 1982	REVISED COSTS 1983
A. Site Decommissioning	$ 887,600	$ 927,542[2]
B. Radiological Survey	13,740	14,358[2] ok
C. Facility Site Reclamation (includes maintenance costs)	70,304	73,468[2]
D. Access Road Reclamation (includes maintenance costs)	14,607	15,264[2]
E. Tailings Impoundment Area Reclamation (includes maintenance costs)	1,113,135	459,992[3]
F. Inspection for 5 years after closure	37,316	38,995[2]
Subtotal	$2,136,162	$1,529,619
Contingency (15% of subtotal)	320,424	229,443
TOTAL	$2,456,586[1]	$1,759,000

[1]Cost estimates were estimated in March 1982and were subsequently revised in April 1982 to $1,875,000 because Plateau agreed to limit tailings placement to Cells 1, 2, and 3.
[2]1982 cost plus 4.5 percent inflation factor.
[3]Cost was estimated in April 1983.

3.1 Tailings Impoundment Area Cost Breakdowns

	Impoundment Cap	Quantity	Cost
1.	Install 6 ft. of clay over the impoundment area and compact @ $3.14/yd^3.	98,329 yd^3	$308,753

Revised 6/16/83

plateau resources LIMITED

General Office: 772 Horizon Drive, Grand Junction, CO 81501 (303) 245-5460
Corporate Office: 212 West Michigan Avenue, Jackson, MI 49201 (517) 788-1942
Registered Office: 136 South Main, Salt Lake City, UT 84101 (801) 534-0734

April 11, 1983

U. S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, Maryland 20910

Attention: Mr. R. Dale Smith

Gentlemen:

Reference: SUA-1371, Docket No. 40-8698 -- Revision of Surety

The revised surety estimates and discussion of a proposed method of capping the Shootaring Canyon Processing Facility's tailings impoundment contained in the attachment to this letter provide Plateau Resources Limited's response to Condition No. 39 of Source Material License SUA-1371. This cost estimate reflects the facility's temporary shutdown status. This submittal revises the current surety arrangements to more accurately reflect the costs of decommissioning and reclamation of the facility in the unlikely event that it would be permanently shutdown during the interval between now and the expected start-up in late 1984. A plan is presented for stabilizing and capping the tailings impoundment if it becomes necessary to do so during the interim period.

If you have any questions, please call Mr. U. K. Gupta or me at (303) 245-5460.

Sincerely,

Fred W. Gerdeman

Fred W. Gerdeman
Governmental Affairs Supervisor

FWG/ksd

Enc.

cc: Mr. U. K. Gupta

Interim Surety Estimates for Decommissioning and Reclamation

Shootaring Canyon Processing Facility
License No. SUA-1371, Docket No. 40-8698

Prepared For:
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Prepared By:
Plateau Resources Limited
772 Horizon Drive
Grand Junction, Colorado 81501

April 1983

1.0 Introduction

The purpose of this submittal is to address the requirements of the third paragraph of Condition 39 of Source Material License SUA-1371 (Amendment No. 6) which reads as follows, "Prior to April 13, 1983, the licensee shall submit proposed surety arrangement revisions to include reclamation costs of Cell Nos. 4 and 5. The proposed revised surety arrangements shall also address the need for adjustment of existing surety arrangements to reflect the effects of inflation." Plateau Resources Limited's Shootaring Canyon Uranium Processing Facility commenced start-up operation on April 13, 1982 and began normal operation on June 1, 1982. On August 18, 1982 the Company temporarily suspended operations, and spent several weeks in recovering the yellowcake that was in the plant circuit and in clean-up and maintenance work.

Since that time there have been no milling operations at the Processing Facility and none are planned until late 1984. A small crew of plant employees has been kept to maintain the facility. The facility's analytical laboratory is continuing to run ore samples for the Tony M mine, and tailings and contaminated equipment from the Hydro-Jet facility (SUA-1013), which is being decommissioned, are being disposed of in the tailings impoundment.

After completion of the decommissioning of the Hydro-Jet facility the estimated total amount of material in the tailings impoundment would not exceed the total volume available in Cell Nos. 1, 2, and 3, and the surface acreage covered by tailings and other contaminated material will be substantially less than the 29.36 acre figure that was used as the basis for estimating the present surety amount. Therefore, Cell Nos. 4 and 5 will not be needed in 1983 or 1984 as was anticipated earlier.

Due to the reduction in volume and surface area of the tailings to far below the amount for which surety arrangements were made and Plateau's plans for not restarting the Processing Facility until late 1984, Plateau proposes that the surety amount be reduced from $1,875,000 to $1,800,285. This amount provides for reclamation of the impoundment as described in this report, and increases (for inflation) the other decommissioning and reclamation cost estimates that were provided in Plateau's "Decommissioning and Reclamation Plan" which was submitted on January 7, 1982 and revised March 17, 1982. As discussed in the aforementioned plan and this proposal $1,759,000 should provide sufficient surety to cover the projected costs of decommissioning and reclamation of the Processing Facility until it begins operation again. Prior to restarting the facility Plateau will notify the U. S. Nuclear Regulatory Commission and, if conditions extant at that time warrant it, increase the surety amount to reflect the Company's plans and proposed level of operation.

2.0 Tailings Impoundment Area

In the unlikely event that reclamation of the tailings impoundment is required during the interim period (temporary shutdown) the plan discussed on pages 3-6, 3-7, and 3-8 of the "Decommissioning and Reclamation Plan" would be implemented. Current estimates are that a total of 126,946* cubic yards of contaminated material will have been placed in the impoundment after Hydro-Jet decommissioning as shown in the breakdown given in the following table.

If the material between Cell Nos. 1, 2, and 3 and Nos. 4 and 5 is purposefully breached and the contours are altered slightly by using heavy equipment to straighten them out the contaminated material in the impoundment behind the cross-valley berm could be levelled to the 4432 foot elevation after dewatering.** After the cross-valley berm above 4432 feet is levelled the cap as described in the Processing Facility's Environmental Report will be constructed over the downstream face of the berm (3H:1V finish slope) and the tailings. The resulting cap would be essentially level on top and would feather into the existing contours to prevent runoff from impounding on the sides or behind the cap. The existing slope on the downstream face of the cross-valley berm is 2H:1V, but it will be reduced to a 3H:1V slope by the addition of fill material above the clay cap layer.

Placing and compacting six feet of clay over the top of the impoundment would require 91,712 cubic yards of bentonite and would fill the impoundment to the altered 4438 foot contour. The two feet of sandy material over the clay would require 38,706 cubic yards, and would bring the elevation to 4440 (altered contour). Addition of one foot of gravel, cobbles, and sand would require 21,169 cubic yards for a final elevation of approximately 4441 feet. To cap the downstream face of the cross-valley berm it will be necessary to use 6,617 cubic yards of clay, 10,087 cubic yards of sand, and 2,119 cubic yards of gravel and cobble. Total amounts of each of the three capping layer materials are as follows:

*This is a conservatively high estimate. The actual calculated volume is 95,209.5 cubic yards, and the 126,946 cubic yards represents a twenty-five percent increase in this.

**The altered contours are shown on the attached map and are labelled as such.

Clay		Volume (yd^3)
Level cap		91,712
Cross-valley berm face		6,617
	Total	98,329

Sand		
Level cap		38,706
Cross-valley berm face		10,087
	Total	48,793

Gravel, Cobble, Sand		
Level cap		21,169
Cross-valley berm face		2,119
	Total	23,288

Several areas will require filling to ensure that no runoff is trapped behind the impoundment. Borrow material for these fills will be obtained from the immediately adjacent area, and will consist of a mixture of clay, sand, and gravel. Earthmoving costs for filling these areas are given below and the areas are shown on the attached map.

Volume for Fills

Location	Volume (yd^3)
Northeast corner	480
Northwest corner	579
Other	100
	1,159

The approximate time for one Cat 651 scraper to load, transport and place 1,159 cubic yards of unconsolidated fill for a short distance is 20 hours. Therefore, the cost of filling the low areas is 20 hours x $180.00/hour = $3,600.00.

3.0 Decommissioning/Reclamation Cost Estimates and Revisions

The estimated costs presented in this section include reclamation costs for the impoundment and increases (for inflation from 1982) for the cost estimates that were given in Section 5 of the March 17, 1982 revision to the "Decommissioning and Reclamation Plan". The following table follows the general format of the table in sub-Section 5.1.

DECOMMISSIONING/RECLAMATION COST ESTIMATE

SUMMMARY

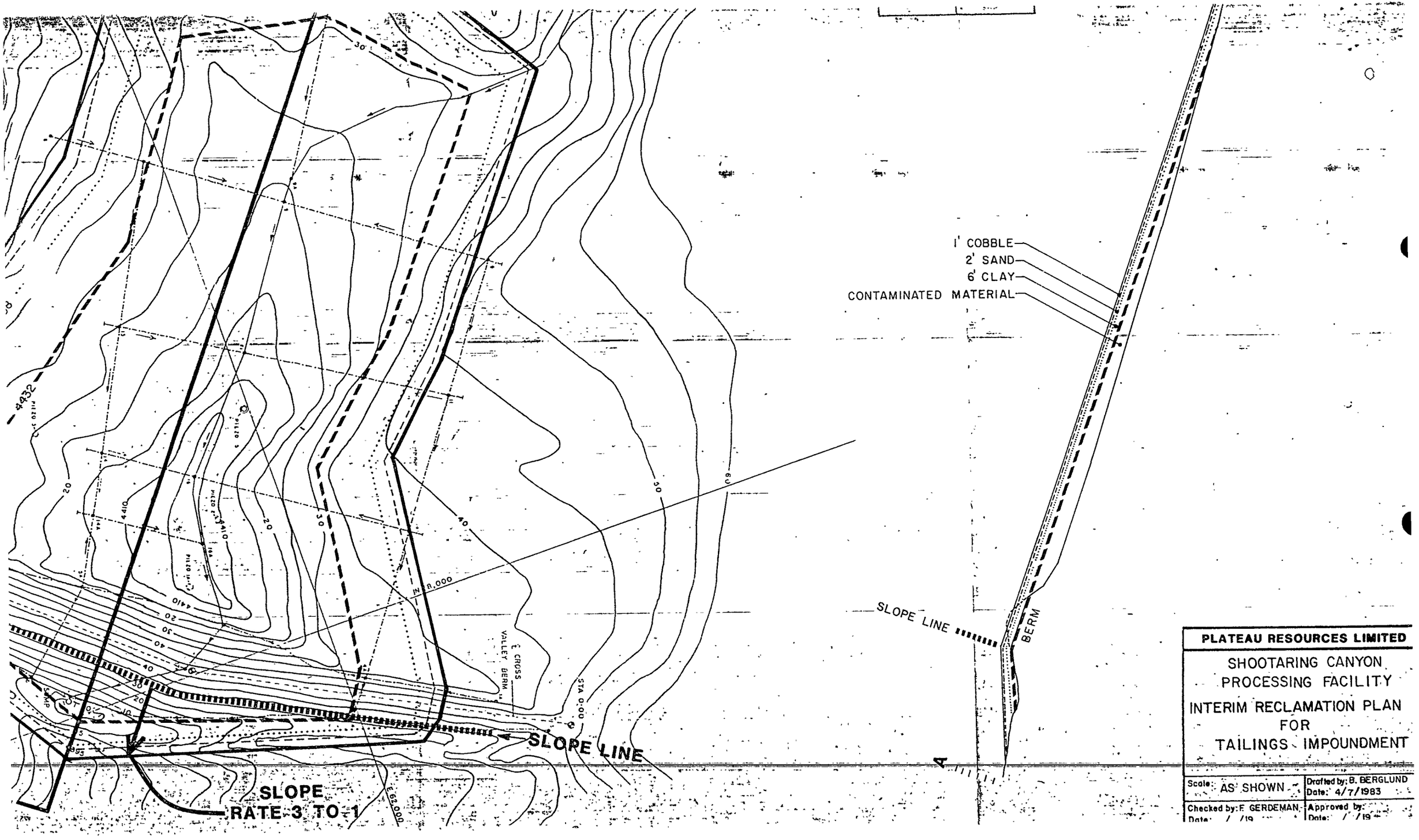
TASK DESCRIPTION	ESTIMATED COSTS 1982	REVISED COSTS 1983
A. Site Decommissioning	$ 887,600	$ 927,542[2]
B. Radiological Survey	13,740	14,358[2]
C. Facility Site Reclamation (includes maintenance costs)	70,304	73,468[2]
D. Access Road Reclamation (includes maintenance costs)	14,607	15,264[2]
E. Tailings Impoundment Area Reclamation (includes maintenance costs)	1,113,135	459,992[3]
F. Inspection for 5 years after closure	37,316	38,995[2]
Subtotal	$2,136,162	$1,529,619
Contingency (15% of subtotal)	320,424	229,443
TOTAL	$2,456,586[1]	$1,759,000

[1]Cost estimates were estimated in March 1982and were subsequently revised in April 1982 to $1,875,000 because Plateau agreed to limit tailings placement to Cells 1, 2, and 3.
[2]1982 cost plus seven percent inflation factor.
[3]Cost was estimated in April 1983.

3.1 Tailings Impoundment Area Cost Breakdowns

Impoundment Cap	Quantity	Cost
1. Install 6 ft. of clay over the impoundment area and compact @ $3.14/yd^3.	98,329 yd^3	$308,753

	Quantity	Cost
2. Install a minimum 2 ft. of sandy soil material over clay and compact @ $2.09/yd^3.	48,793 yd^3	$101,977
3. Install 1 ft. of gravel and rock @ $1.57/yd^3.	23,288 yd^3	$ 36,562
Grading and Other Earthwork		
1. Bring low areas up to grade (20 hrs. @ $180/hr).	1,159 yd^3	$ 3,600
2. Grade remaining sections of the cross-valley berm (5 hrs. @ $140/hr)	lump sum	$ 700
3. Miscellaneous earthwork (D-9 @ $140/hr. x 20 hrs. = $2,800, and grader at $140/hr. x 40 hrs. = $5,600)	lump sum	$ 8,400
TOTAL		$459,992



PLATEAU RESOURCES LIMITED

SHOOTARING CANYON
PROCESSING FACILITY
INTERIM RECLAMATION PLAN
FOR
TAILINGS IMPOUNDMENT

Scale: AS SHOWN	Drafted by: B. BERGLUND Date: 4/7/1983
Checked by: F. GERDEMAN Date: / /19	Approved by: Date: / /19

EAK

General Office: 772 Horizon Drive, Grand Junction, CO 81501 (303) 245-5460
Corporate Office: 212 West Michigan Avenue, Jackson, MI 49201 (517) 788-1942
Registered Office: 136 South Main, Salt Lake City, UT 84101 (801) 534-0734

May 17, 1982

U.S. Nuclear Regulatory Commission
Special Attn: Mr. Thomas Fleming
7915 Eastern Avenue
Silver Spring, Maryland 20910

RE: SUA-1371, DOCKET NO. 40-8698

Dear Mr. Fleming:

Enclosed, per your request, is the cost breakdown for page 5-2 of the "Decommissioning and Reclamation Plan, Shootaring Canyon Processing Facility". If you have any questions, please contact me.

Sincerely,

Fred W. Gerdeman

Fred W. Gerdeman
Governmental Affairs Supervisor

FWG:jkb

Enclosure

DECOMMISSIONING/RECLAMATION COST BREAKDOWN

(Expansion of Page 5-2 of the Decommissioning and Reclamation Plan)

Site Decommissioning

Dismantling and Disposal of Non-Salable Items

Facility	Quantity	Cost
a. Structures (roofing & siding)	870 tons 93,500ft.^{2}	$156,000

	Time	Rate	Cost
Labor	4,958	$12.00/hr	$ 59,496
Equipment			
Crane	2 mos.	10,000/mo[a]	20,000
Dump Truck	4 mos.	4,000/mo	16,000
D-9 Caterpillar	0.5 mo.	22,000/mo	11,000
Welding Truck	4 mos.	3,300/mo	13,200
Loader	4 mos.	6,000/hr	24,000
			84,200
Lodging			9,990
Misc.			2,310
		TOTAL	$156,000

a. Includes Operator

Note: Equipment costs include mobilization and demobilization charges.

Facility	Quantity	Cost
b. Concrete	4,170yd.^{3}	$102,000

	Time	Rate	Cost
Labor	783	$12.00/hr.	$ 9,396
Equipment			
Dump Truck	3 mos.	4,000/mo	16,000
D-9 Caterpillar	2 mos.	22,000/mo	44,000
Welding Truck	2.7 mos.	3,300/mo	8,910
Loader	3 mos.	6,000/mo	18,000
			86,910
Lodging			1,468
Misc.			4,226
		TOTAL	$102,000

Facility	Quantity	Cost
c. Process Equipment (30% burial)	1,335 tons	$261,000

	Time	Rate	Cost
Labor	7,500 hr.	$12.00/hr	$ 90,000
Equipment			
Crane	3.75 mos.	10,000/mo	37,500
Dump Truck	4 mos.	4,000/mo	16,000
D-9 Caterpillar	1 mo.	22,000/mo	22,000
Welding Truck	4 mos.	3,300/mo	13,200
Loader	4 mos.	6,000/mo	24,000
Scissor Lift (40')	4 mos.	1,850/mo	7,400
Boom Crane (40' boom)	4 mos.	1,980/mo	7,920
Other (winches, air compressor, etc.)	5 mos.	3,250/mo	16,250
			$144,270
Lodging			15,300
Misc.			11,430
		TOTAL	$261,000

Facility	Quantity	Cost
d. Piping & Insulation (30% burial)	Lump Sum	$117,000

	Time	Rate	Cost
Labor	2,500 hrs.	$12.00/hr	$ 30,000
Equipment			
Dump Truck	4 mos.	4,000/mo.	16,000
Welding Truck	5 mos.	3,300/mo.	16,500
Loader	5 mos.	6,000/mo.	30,000
Scissor Lift	1.7 mos.	1,850/mo.	3,145
Boom Crane	2 mos.	1,980/mo	3,960
Other (winches, air compressors, etc.)	2 mos.	3,250/mo	6,500
			76,105
Lodging			4,688
Misc.			6,207
		TOTAL	$117,000

Facility	Quantity	Cost
e. Electrical & Instrumentation	Lump Sum	$72,000

	Time	Rate	Cost
Labor	2,415 hours	$12.00/hr	$28,980
Equipment			
Crane	0.7 mos.	10,000/mo	7,000
Dump Truck	2 mos.	4,000/mo	8,000
Loader	1 mo.	6,000/mo	6,000
Scissor Lift	2.7 mos.	1,850/mo	4,995
Boom Crane	1.5 mos.	1,980/mo	2,970
Other (winches, air compressors, etc.)	2.6 mos.	3,250/hrs	8,450
			37,415
Lodging			4,800
Misc.			805
		TOTAL	$72,000

Facility	Quantity	Cost
f. Building Components	28,593 yd^3	$40,000

Labor	Time	Rate	Cost
	1,415 hrs.	$12.00/hr.	$16,980
Equipment			
Crane	0.1 mo.	10,000/mo	1,000
Dump Truck	1 mo.	4,000/mo	4,000
Welding Truck	0.5 mo.	3,300/mo	1,650
Loader	1.7 mo.	6,000/mo	10,200
Scissor Lift	0.1 mo.	1,850/mo	185
Boom Crane	0.2 mo.	1,980/mo	396
Other (winches, air compressors, etc.)	0.4 mo.	3,250/mo	1,300
			18,731
Lodging			2,683
Misc.			1,606
		TOTAL	$40,000

Facility	Quantity	Cost
g. Demolition - Other Items		$18,000

	Time	Rate	Cost
Labor	992	$12.00/hr	$11,904
Equipment			
Other (winches, air compressors, etc.)	1 mo.	3,250/mo.	3,250
			15,154
Lodging			1,860
Misc.			986
		TOTAL	$18,000

plateau resources LIMITED

General Office: 772 Horizon Drive, Grand Junction, CO 81501 (303) 245-5460
Corporate Office: 212 West Michigan Avenue, Jackson, MI 49201 (517) 788-1942
Registered Office: 136 South Main, Salt Lake City, UT 84101 (801) 534-0734

January 7, 1982

Mr. Ross A. Scarano
U. S. Nuclear Regulatory Commission
Uranium Recovery Licensing Branch
7915 Eastern Avenue
Silver Springs, Maryland 20555

RE: DECOMMISSIONING AND RECLAMATION PLAN - SOURCE MATERIAL LICENSE NO. SUA-1371, DOCKET NO. 40-8698

Dear Mr. Scarano:

In accordance with conditions 38 and 39 of the above referenced license, Plateau Resources Limited herewith submits the decommissioning and reclamation plan for its Shootaring Canyon Processing Facility, Garfield County, Utah for your review and approval.

If you have any questions, please contact Mr. U. K. Gupta, Process Manager at (303) 245-5460.

Sincerely,

Fred W. Gerdeman

FWGerdeman
Governmental Affairs Supervisor

FWG/cc

Enclosure: 5 copies

plateau resources

LIMITED

DECOMMISSIONING AND RECLAMATION PLAN

SHOOTARING CANYON PROCESSING FACILITY

LICENSE No.SUA-1371,DOCKET No. 40-8698

PREPARED FOR :

U.S. NUCLEAR REGULATORY COMMISSION.

DECOMMISSIONING AND RECLAMATION PLAN FOR PLATEAU RESOURCES LIMITED'S SHOOTARING CANYON PROCESSING FACILITY - LICENSE NO. SUA-1371, DOCKET NO. 40-8698.

Prepared For:

U. S. NUCLEAR REGULATORY COMMISSION

Plateau Resources Limited
772 Horizon Drive
Grand Junction, Colorado 81501

January 1982

LIST OF REVISIONS

REVISION DATE:	REMOVE OLD PAGES:	INSERT NEW PAGES:
3/17/82	N/A	Title Page
3/17/82	Contents	Contents
3/17/82	N/A	List of Revisions
3/17/82	3-4	3-4 and 3-4.1
3/17/82	3-6	3-6 through 3-8
3/17/82	5-1	5-1
3/17/82	5-2	5-2 and 5-2.1
3/17/82	5-3 through 5-5	5-3 through 5-5
3/17/82	N/A	Figure 3

CONTENTS

Revised-3/17/82

CONTENTS

1.0 Introduction

This plan for decommissioning and reclamation of the Shootaring Canyon Processing Facility was prepared as specified in Source Material License No. SUA-1371 Condition 38 and Mr. Ross A. Scarano's letter to Plateau Resources Limited (Plateau) dated February 6, 1981 (see Appendix C). The purpose of the plan is to describe the procedures for decommissioning, stabilizing, and reclaiming the plant site and tailings disposal area, and to provide a list of each activity, cost estimates, and the basis for the costs for each activity should an outside contractor be required to perform the activity.

It should be noted that the wording and intent of the decommissioning and reclamation sections of the Environmental Report, Shootaring Canyon Uranium Project, Garfield County, Utah, and the FES (NUREG-0583) are adhered to in this plan, except where modifications were necessary to comply with conclusions of the Final Generic Environmental Impact Statement on Uranium Milling (NUREG-0706) and advances in the state-of-the-art reclamation.

2.0 Decommissioning

Decommissioning of the processing facility will entail dismantling, decontaminating (where possible), and disposing of buildings, foundations, contaminated equipment, and excavating contaminated areas as necessary to permit unrestricted use of the site. The last cells of the tailings storage area will be capped and stabilized. The tailing cells will be progressively covered during the operating life of the processing facility, and it is estimated that only 6.25 acres (2.53ha) will require capping with clay, sand, and gravel at the time of final decommissioning. Tailings management and design is described in Appendix A. When decommissioning is completed the site will be reclaimed.

2.1 Dismantling, Decontamination, Disposal

Following cessation of milling activities a radiological survey of the site will be conducted to determine the extent and degree of decontamination required at the site. Salvageable equipment and buildings will be dismantled and decontaminated to acceptable levels of surface radio-activity where practicable.* Sandblasting, scrubbing with detergents, high-pressure water and other methods of physical decontamination will be adopted as prescribed by the Environmental and Radiological Health Supervisor (ERHS). Concrete floors, foundations, sumps, and subsurface piping with unacceptably high levels of uranium and daughter nuclides would be broken up, removed, and buried in the tailings area. Contaminated earth beneath the foundations and equipment removed and the ore stockpile pads would be excavated to the required depth and also taken to the tailings area.

*Decontamination of plant structures shall be guided by Table 1 of Regulatory Guide 1.86, in which limits are specified for residual surface decontamination levels and Annex C, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses by Byproduct, Source or Special Nuclear Material."

Equipment and buildings (especially those constructed of bolted prefabricated steel construction) that meet U.S. Nuclear Regulatory Commission (NRC) surface radiation standards at the time of decommissioning may be sold or reused elsewhere.**

2.2 Postoperational Monitoring Program

Monitoring and decontamination will be supervised by the ERHS. Monitoring will continue during decommissioning (and for 5 years thereafter). The postclosure monitoring program is discussed later in this plan. Protective equipment, supervisory, and industrial safety requirements will be enforced. The radiological survey conducted after cessation of milling will involve making direct and indirect measurements of surface contamination. Surface and subsurface soil profile sampling will be done in combination with gamma-dose rate measurements of the site to demonstrate compliance with land cleanup requirements applicable to portions of the site away from the tailings disposal area. Monitoring of the tailings disposal area will be accomplished to demonstrate compliance with radon surface flux and ambient radon concentration attenuation standards.

Upon completion of decontamination of the processing facility, the postoperational monitoring period will end and the postclosure monitoring period (discussed in Section 4 of this report) will commence.

**This section is modeled after and uses parts of Section 8.5 of the FGEIS on Uranium Milling NUREG-0706.

3.0 Reclamation

The purpose of this reclamation program is to restore lands disturbed by project activities to a productive condition consistent with past and present uses of the area. This consists of restoring landscape contours to slopes similar to predisturbance conditions and, in some instances, replacing a sufficient thickness of topsoil to enable native vegetation to become reestablished whenever possible.

Several characteristics of the project area, and southeastern Utah in general, are considered nonconducive to the rapid establishment of native plant species on disturbed areas. The most significant factors are the arid climate and the poorly developed soil. The low average annual precipitation of 6 to 8 inches (15- 20cm); frequent droughts; extreme temperatures; high wind erosion; and a loose, undifferentiated soil profile with poor moisture-holding capacity and little organic content contribute to inherent reclamation problems in the area.

Based on the types of disturbances anticipated, the environmental characteristics of the area, the present and proposed land uses, and the state-of-the-art knowledge on reclamation in arid environments, reclamation of areas disturbed by the project will include: Covering and stabilizing the tailings impoundment area, removing structures and regrading disturbed areas to blend with surroundings, judicious replacement of stockpiled topsoil in selected areas amenable to plant growth, and revegetating disturbed areas using native and introduced species.

3.1 Present and Proposed Use of the Land

Historically, the project area has been used for seasonal livestock grazing and as wildlife habitat. Human use of the project area for activities such as camping, hiking, sightseeing, and hunting has been minimal to date although other areas in southeastern Utah are important for one or more of these activities.

Livestock grazing and wildlife habitat will probably continue to be the principal uses of the affected area after termination and closure of the project. Agricultural use of the area, for either crop or hay production, is not anticipated due to the poor soil structure and scarcity of water. There are presently no urban or industrial developments in the project area other than the facilities related to the project; and none are planned for the future.

The purpose of the reclamation program is to restore those lands disturbed by project activities (except the tailings impoundment area) to an acceptable condition for livestock grazing and wildlife habitat. Since the existing vegetation is generally sparse and is dominated by widely spaced shrubs and by relatively few grasses that produce useful amounts of forage, successful reclamation in the project area will result in the establishment of sparse vegetation with generally low forage production.

3.2 Lands Disturbed for Ore Processing Facility

Approximately 18 acres (7.28ha) were leveled for construction of the plant office, ore stockpile pads, plant buildings, and auxiliary structures. After topsoil removal and stockpiling, approximately 90% of the area was graded to develop a smooth, nearly level surface. Topsoil stockpiling and stabilization was accomplished as described in Appendix B. The surface gradient is toward the impoundment area to ensure runoff is drained as required. Filling was required over the balance of the graded area. Typically, cuts ranged from zero to about 15 feet (4.57m) in depth, except in localized areas (such as the ore dump pocket and connecting conveyor tunnel) where excavation was as deep as 45 feet (13.7m). Maximum fill depth was approximately 40 feet (12.2m) at the southwest corner of the ore storage patio.

At project termination all plant structures and facilities will be dismantled and removed from the plant area. Structural foundations, tank containment dikes, and other elements extending above the general grade of the plant site will be leveled, and used to fill depressions within the plant

area, such as the excavation for the ore dump pocket. All depressions within the plant site will be filled and the general surface gradient of the graded area will be maintained so all runoff from the area will continue to flow to the tailings impoundment area. Heavy equipment will be used to recontour the site to blend with the natural surrounding topography. Topsoil will be added where necessary to a depth of approximately 1 foot (0.3m). Fertilization, if needed, and seeding will follow seedbed preparation to promote the establishment of vegetation in accordance with the Utah Mined Land Reclamation Act of 1975. Mulch will be used when necessary as determined by Plateau's Reclamation Supervisor. Existing fences will remain standing until revegetation is successful. Plant species to be seeded may include: sage (Artemisia spp.), Indian ricegrass (Oryzopsis hymenoides), Mormon tea (Ephedra spp.), galleta (Hilaria jamesii), Siberian or Crested Wheatgrass (Agropyron sibiricum), Salina wildrye (Elymus salinas), saltbushes (Atriplex spp.), blackbrush (Coleogyne ramosissima), Apache-plume (Fallugia paradoxa), and/or desert bitterbrush (Purshia glandulosa), and rabbitbrush (Chrysothamnus spp.).

An area adjacent to the plant site was cleared and graded for use as a construction equipment and materials storage yard. At closure, the construction yard will be closed, all equipment will be removed, the area will be regraded to conform with the general topography of its surroundings, and disturbed areas will be fertilized and seeded.

Due to ongoing research and development, the state-of-the-art of desert reclamation is making rapid advances. Improved methods of stabilizing and revegetating arid sites will be developed during the operational life of the plant. Cost efficient and economically viable techniques developed from information obtained from test plots (already installed on-site) and experience gained through Plateau's on-going reclamation of borrow areas adjacent to the plantsite will also be adopted when implementing soil stabilization and revegetation.

3.3 Tailings Impoundment Area

After a detailed evaluation of the different options for the tailings

disposal program, a staged covering and reclamation of the tailings impoundment area was selected for the project in order to minimize radon emission during operation.

This technique of tailings management consists of dividing the whole impoundment area into three possible sections. Appendix A provides additional information on the tailings management plan. Each section represents a storage area for the tailings for a specified period of time which will be designated as a stage for the operation of the plant.

Stage I involves a total storage area of approximately 25 acres (10.16ha) and would last for about 4 years of operation. This section of the impoundment is planned to contain five tailings collection cells. All these cells have an underdrainage system of perforated pipes. Effective operational procedure will dictate the number of cells used at any one time.

After the tailings in any cell have reached a predetermined elevation it will be inactivated, and, as soon as this individual cell has dried sufficiently to allow the movement of equipment, the cell will be reclaimed.

To ensure continued operation of the processing facility it will be necessary to start construction of tailings impoundment cells in Section II of the impoundment area (south of the present cross-valley berm) before all cells in Section I are filled. Thus, when all cells in Section I are filled, the tailings will be placed into the Section II cell(s) without any interruption of plant operations. There are 25.20 acres in the impoundment, and the berm face would cover approximately 4.16 acres after regrading it to a 3H:1V slope. By the time tailings begin to be discharged into Section II cells, one or more of the Section I cells would have been reclaimed so the surface area covered by exposed tailings will not exceed the area covered by surety.

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After the tailings in any cell have reached a predetermined elevation it will be inactivated, and, as soon as this individual cell has dried sufficiently to allow the movement of equipment, the cell will be reclaimed.

Construction of the second section for Stage II tailing impoundment would be started before Section I has reached its capacity. The tailings will be discharged into cells in Section II while the areas in Section I are being reclaimed.

This operational philosophy would leave a very small area to be reclaimed at the final closure of the Processing Facility. It is estimated that after the final stage of the operation, the maximum area left for reclamation will be about 25 percent of 25 acres (10.16ha) (area of final storage section, 6 cells). Data developed during the operation of Stage I will be used to design and construct future cells.

At project termination the tailings dam will be approximately 120 feet (36.58m) high, and will have a maximum base width of about 500 feet (152.4m).

When the last of the Section II cells are being filled with the tailings (they should be in operation for approximately four to five years), the dam will be raised to Stage II height (approximately 120 feet (36.58 m) high), and cells will be constructed in Section III. Tailings will then be discharged into the Section III cells while the most recently used cell or cells in Section II are stabilizing and being reclaimed. As with the transition from use of Section I to Section II, the surface area of uncapped tailings will not exceed the area covered by surety.

This operational philosophy would leave a very small area to be reclaimed at the final closure of the Processing Facility. It is estimated that after the final stage of the operation, the maximum area left for reclamation will be about 25 percent of 25 acres (10.16ha) (area of final storage section, 6 cells). Data developed during the operation of Stage I will be used to design and construct subsequent tailings impoundment cells in Section II and Section III.

At project termination the tailings dam will be approximately 120 feet (36.58m) high, and will have a maximum base width of about 500 feet (152.4m).

The crest of the dam will extend about 13 feet (3.96m) above the level of the tailings against the dam face. Reclamation of the tailings impoundment will be accomplished by capping the remaining open cells (those not capped during plant operation) with a cap including about 6 feet (1.8m) of compacted clay, which will limit, to near background levels, radon emanation from the tailings to the atmosphere.

To protect the clay cap from cracking due to desiccation, it will be covered with about 2 feet (0.6m) of locally available sandy material. To protect the sandy cover layer from erosion, it will be covered with a layer of gravel and cobbles about 1 foot (0.3m) thick.

It is noted that optimization in the design and construction of caps for uranium mill tailings is an evolving technology. If a more cost effecient method is found, it will be adopted when the time comes to construct the cap. Since the cap construction will continue throughout most of the project operating life, this project will provide excellent opportunities for contributions to the evolution of the technology.

At this time, it is not certain that net benefits may be realized by establishing vegetation over closed tailings impoundments in arid regions, such as the Shootaring project area. Therefore, the cap will not be seeded. With a well established vegetative cover, water losses from the cap due to evapotranspiration would be greater than evaporation losses from a similar cap without vegetation. It seems quite certain that maintaining as much water as possible in both the cap and the underlying tailings is beneficial in controlling radon emissions from the tailings. Due to its low water holding capacity and low fertility, the surface layer of gravel and rock required on the cap to prevent wind erosion is not conducive to plant growth. However, water and windborne seeds will be deposited on the tailing cap. Some seeds will germinate and ultimately a vegetative cover will be established on the tailings cap. It is not expected that the plant roots will penetrate the clay layer of the cap; thus the integrity of the containment will not be degraded as a result of the vegetative cover.

After reclamation, two spillways would be constructed to protect the dam and tailings cap against erosion and flood flows. To provide for the long term stability of the tailings containment system, water flowing across the face of the dam should be minimized. One spillway would be excavated in the sandstone of the left (east) abutment of the dam to direct drainage to the downstream portion of the impoundment basin. The other spillway would be excavated in the sandstone formation along the northwest corner of the impoundment. This spillway would divert drainage to Lost Springs Wash. Both spillways would have crest elevations 3 feet (0.9m) above the level of the cap and would be sized to pass the maximum probable flood. However, until sediment deposition fills in the impoundment to the level of the spillway crests, spillway flows would be rare events.

It is expected that there will be continuous accretion to the cap due to retention of sediments carried onto the cap by runoff from the small tributary watershed of the basin until a dynamic equilibrium between erosion and sedimentation occurs. Water flowing onto the cap will seep down through its upper layers onto the clay layer. This will tend to maintain the clay's moisture content at near saturation, and enhance the cap's effectiveness as a barrier to the movement of radon gas emanating from the tailings. The massive bluff west of the impoundment provides a windbreak that is expected to cause a net deposition of wind borne soil onto the cap, adding to its thickness.

(To address an NRC staff concern voiced during the March 12, 1982 meeting between NRC and Plateau, the following is appended to this section.)

Should reclamation be required due to unforeseen circumstances prior to the expected life of the processing facility, any tailings impoundment area not reclaimed during operations will be covered with the clay, sand, and gravel cap as described on page 3-5 of this plan. The cap will extend beyond the outer limits of the tailings to ensure complete

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coverage to limit radon emanation. The downstream face of the cross-valley berm would be sloped to a stable configuration (3H:1V slope) and the cap would be extended to cover the face to protect it from erosion.

Given the scenario of the processing facility's shutdown when only one or two cells are partially or completely filled, reclamation would proceed in much the same manner as discussed previously, but additional earthwork would be required. The exposed sides of the dikes between the used and unused cells would be reshaped to lessen their slope, and then they would be reclaimed by continuing the cap over them.

There are two basic configurations that the covered tailings impoundment would have if this scenario should happen. If cells 1, 2, and 3 are used, the cap would be extended (at an approximately level grade) to the north to disallow impoundment of run off behind the cells. The extension of the cap that would be constructed with the purpose of bringing the low areas up to grade would not necessarily be constructed in the same manner as the portions of the cap that covers tailings. The cap extension would be constructed of locally available fill materials and would be riprapped to prevent erosion.

The second basic configuration would occur if a combination of cells 1, 2, and 5 or 1, 3, and 4 were used. Either of these combinations could also lead to a situation in which runoff water would be impounded. To prevent impounding water, the berms would be shaped and capped as described previously. The cross-valley berm would be breached (where it was not containing the tailings), and a riprapped diversion channel would be built outside of the tailings cap perimeter. Construction of the channel would prevent runoff from eroding the cap and would divert water through the breached part of the cross-valley berm.

No reclamation cost estimates are provided for the above two configurations because they would cost significantly less than the surety posted for the impoundment area. Both would entail relatively small expenditures for engineering, fill materials, and haulage. Cost of constructing a riprapped diversion channel and breaching the cross-valley berm would be significantly less than constructing a lever cap to preclude water impoundments.

As stated in Section 3.3.2.1 of NUREG-0583 (FES for the Shootaring Canyon Uranium Project; July, 1979) and Section 9.4 of the Environmental Report, Shootaring Canyon Uranium Project, Garfield County, Utah, locally available materials will be used to construct the impoundment cap. Bentonitic clay from the Brushy Basin Member of the Morrison Formation will be compacted to form the 6.0 ft (1.8 m) layer. This clay will be obtained from the same borrow area ("Ga") as the clay used for the impoundment liner. Borrow Area "Ga" is located on Bureau of Land Management (BLM) controlled land and is covered by a materials sale contract (U-45859) with Plateau. Reclamation and surface protection requirements for this borrow area are stipulated in the contract and the BLM holds a performance bond as surety.

The 2.0 ft (0.6m) layer of sandy material will be obtained from Borrow Area E. This material is a red, fine sand, with silt varying from a trace to a significant percentage. Borrow Area E is located west of the processing facility. Material will be removed from this borrow area in a sequential stripping operation so very little, if any, recontouring will be required. Much of the area will be stripped to bedrock and the remaining parts of it will be reseeded.

Borrow Areas A, A', or C will be the source of the gravel, cobble, sand layer that will protect the cap from erosion. Test pit logs for these areas describe the materials as hard, sub-rounded to sub-angular cobbles and gravel, and sand with calcareous cement. Material from these area was used during construction of the processing facility under material sales contract U-44547 with the BLM. The BLM requires a surety bond of twenty percent of the contract amount for this type of sale to cover reclamation costs.

4.0 Long-Term Surveillance, Maintenance, and Control

The design, construction, operation, and closure of the Shootaring Canyon tailings disposal system have been planned with the objective of creating a facility that, after closure, will endure for many years without requiring either monitoring or maintenance while continuing to provide an environmentally safe and satisfactory performance. However, the operation of the disposal system will be inspected on a schedule for five years after closure to ensure that the system is performing as intended. Accordingly, a monitoring program is planned that will continue for five years after the tailings impoundment is closed. If there are any deficiencies in the system's performance, they are expected to become apparent during the monitoring period and to be corrected before the monitoring program is terminated.

Factors of long-term concern with respect to uranium tailings are the dispersal of tailings by erosion, the contamination of groundwater, and the release of radon to the atmosphere.

4.1 Tailings Dispersal by Erosion

To control water erosion, the final stage of the Processing Facility's tailings impoundment dam has been designed and constructed with a crest extending above the maximum water level that would be reached in the impoundment area under the conditions of the maximum probable precipitation likely to occur at the site. Spillways will divert runoff exceeding the retention capacity of the impoundment. Because the spillway crest will be about 3 feet (0.9m) higher in elevation than the top of the cap to be placed over the tailings, and the dead storage volume provided over the cap and below the spillway crest must be filled before any runoff is passed downstream from the dam. This storage is provided to maximize the capture of available moisture and thereby keep the tailings perpetually moist or wet for purposes of reducing radon emissions without reducing the safety of the structure. Overtopping of the dam crest, with consequent possible erosion, will be prevented by the spillway. The toe of the dam will be protected from erosion during periods of spillway discharge. The downstream face of the dam is protected from rainfall induced erosion by riprap.

Surveillance to establish that the dam will continue to perform as designed (no overtopping) will consist of visual checks of the spillway channel to see that it is unobstructed. Wind deposited sand, rock falls or slides from the walls of the channel, and heavy vegetative incursions into the channel are conceivable types of obstructions. Channel maintenance would involve removal of such obstructions in the unlikely event that it becomes necessary.

The dam was constructed on a sandstone foundation. The techniques employed in construction of the dam yield a stable and dense structure. Some deflection in both the vertical and downstream directions must be expected. Although not expected to be significant, normal settlement under and within the dam will cause the crest of the dam to deflect with respect to the level of the spillway crest. If any settlement is noted by the periodic inspections, it may be necessary to make instrument measurements to determine the amount of settlement and the consequent risk of dam overtopping. Settlement on the order of one foot (0.3m) or more would require a geotechnical investigation to determine the causes of the settlement. Nominal settlement due merely to internal consolidation of the dam after project closure could be remedied by adding materials to the crest, to prevent possible overtopping during heavy precipitation. Major settlement due to any cause would probably require an engineered remedy after the causes of the settlement were established. To prevent dispersal of project tailings by water erosion, it is necessary that the dam not be subjected to substantial and prolonged overtopping.

The rock and gravel zones on the downstream slope and crest of the dam, and the rock and gravel layer to be placed at the top at the tailings cap, will prevent wind erosion of those exposed surfaces. Also, because the tailings disposal basin is effectively surrounded by natural cliffs and hills, it is expected that there will be net deposition of windborne soils over the impoundment area, rather than loss of covering over the tailings due to wind erosion. Accordingly, natural deposition will be exploited to enhance the security of the projected tailings impoundment.

Surveillance or monitoring to determine the effects of wind on the tailings impoundment will be by visual inspection of the dam and the tailings disposal area. If there are any signs of local erosion, rather than

deposition, measures will be taken in the eroding areas to improve the erosion resistance of the surface.

4.2 Groundwater Contamination

The tailings management plan for the Shootaring Canyon uranium project has been developed to prevent contamination of groundwater underlying the tailings disposal area. A clay blanket has been placed over the natural sandstone of the impoundment area to limit the rate of seepage from the tailings into the foundation rock. To reduce the amount of tailings liquids available for seepage from the impoundment, tailings will be distributed around the basin, in such a manner as to continuously provide a large wetted area exposed for evaporation. Also, if excess tailings liquids collect in the drainage system of the impoundment, it will be recycled to the process circuit. By keeping the tailings wet during and after placement, wind erosion and dispersion of the tailings can be minimized.

At the project site, net evaporation from exposed water surfaces will average approximately 70 inches (177.8cm) per year, which is equivalent to approximately 3.6 gallons (13.63 l) per minute per acre of exposed surface. At an ore processing rate of 1000 tons (907mt) per day, and assuming a tailings slurry containing 49 percent solids by weight, approximately 175 gallons (662.4 l) per minute of tailings liquids will be delivered to the impoundment. Saturated, dense, settled tailings would be expected to have a moisture content of approximately 35 percent. Based on this assumption, approximately 90 gallons (340.7 l) per minute of the tailings liquids will be retained in the settled tailings, leaving approximately 85 gallons (321.7 l) per minute of liquid available for evaporation and/or collection in the drainage system.

Since the tailings management plan provides a means for disposing of all excess tailings liquids during the project operation, no significant amount of free tailings liquid will remain in the impoundment at project termination to seep into the groundwater. Also, after the project is terminated, normal evaporation from the tailings cap will dispose of much of the incident precipitation, including runoff from the basin watershed, on the impoundment basin. Little potential will therefore exist for groundwater contamination

from this project, and the requirements for surveillance of the groundwaters of the area will be minimal.

The monitoring positions located near the impoundment perimeter for monitoring seepage from the basin during project operation will be maintained and observed for five years after project termination. Water collected in the observation well or wells will be sampled and analyzed to determine its source and properties. Test results indicating a significant potential for groundwater contamination will be cause for instituting a field investigation and analysis to determine the scope of the potential problem and to develop appropriate remedies. The installation of collector wells to intercept the contaminated flows with the transfer of the collected liquid to a safe evaporative disposal system, is a possible remedy. The possibility of groundwater contamination from the Shootaring project is considered remote, and opportunities for observing and remedying any potential contamination before it becomes significant to the environment are substantial.

4.3 RADIATION EMISSIONS

The cap to be placed over the tailings impoundment area was designed and will be constructed with the goal of limiting radon gas and gamma radiation emissions from the tailings. After the cap is constructed, a monitoring program will be implemented to determine the actual level of emissions through the tailings cap and the background emissions from surrounding areas.

Three monitoring stations are proposed on the tailings cap. One station will be located near the upstream toe of the dam, where the total depth of tailings will be greatest. Another station will be located near the central portion of the impoundment. The third monitoring station will be positioned at the upper part of the impoundment area.

One thermoluminescent dosimeter (TLD) and two radon cups or their cost effecient technical equivalent will be installed at each monitoring station. The TLD will be mounted 3 feet (1m) above the tailings surface. One radon cup or its equivalent would be placed approximately 4 feet (1.2m) beneath the surface; the other, at a depth of about 1 foot (0.3m). Radon measurements from the two depths at each station will provide data from which a concentration gradient (C_n) can be established; this will indicate the effectiveness of the tailings cap in controlling radon emissions from the impoundment.

Background radon and radiation emissions will be measured at two stations, both located in surface soils near the top of the Entrada Sandstone, similar to the natural surface at the tailings impoundment. One background measuring station will be located approximately one-half mile (0.8km) downstream, or south-southwest (and upwind) from the tailings impoundment dam; the other station will be located to the northeast (downwind), about one-half mile (0.8km) from the impoundment area. Two radon cups or their equivalent and one TLD would be installed at each background monitoring station. The TLDs will be mounted 3 feet (0.3m) above the ground and the radon cups or their equivalent will be placed below the ground surface at 4 feet (1.2m) and 1 foot (0.3m), as above.

Radon cups or their cost effecient technical equivalent and TLDs at the five proposed monitoring stations will be collected, and new ones installed, at 3-month intervals. Data collected for preparing the radiological baseline section of this report indicated marked differences in radon emissions between dry and wet seasons. The differences in emissions were attributed to differences in soil moisture content during the two sampling periods. Since there are pronounced seasonal variations in normal precipitation for the project area, the radon monitoring program will be operated with due regard for seasonal influences. It is proposed that radon cups or their equivalent, and also the TLDs, be installed and collected in conformance with the change of seasons.

After collection, TLDs and radon cups or their equivalent are to be delivered to a laboratory for processing and analysis. The analysis will establish if radon and gamma radiation emissions from the tailings are below

the prescribed limitations. If radon measurements at any time exceed the limits, it may be necessary to take remedial action. Such action could include increasing the thickness of the cap, either locally or entirely, or treating the existing cap to make it a more effective barrier.

An additional monitoring requirement related to project closure is to measure the radon emissions from the clay proposed to be used in the tailings cap. Three potential sources of clay have been identified in the project vicinity. These sources are the Summerville Formation, the Brushy Basin Member of the Morrison Formation, and the Carmel Formation. The emission rate of the clay selected for the cap must be determined so that the portion of the emissions from the in-place cap attributable to the cap may be segregated from the emissions attributable to the tailings. Measurements made over a period of a year, with changes at 3-month intervals, are proposed for evaluating the clay cap material.

A security fence was constructed around the tailings impoundment area and will be maintained throughout the operating life of the project. It is proposed that this fence be left in place and maintained throughout the five-year postclosure monitoring period to aid in preventing possible tampering with the TLDs, which will be mounted above ground. The fence will be inspected, and repaired if necessary, during the normal periodic site monitoring program.

4.4 SUMMARY

The proposed postclosure monitoring program for the tailings disposal

system is summarized as follows. All observations and measurements are to be made at 3-month intervals over a 5-year period following completion of the project closure procedures.

Dam: visual inspection for settlement of crest and erosion of downstream slope.

Spillway: visual inspection for obstructions in channel.

Groundwater: check for water in observation wells and seepage at toe or downstream from dam.

Tailings Cap: visual inspection for signs of wind erosion.

Radiation: change radon cups or their equivalent and TLDs at monitoring stations and analyze results.

5.0 DECOMMISSIONING/RECLAMATION COST ESTIMATES

Decommissioning and reclamation costs provided in this section reflect estimates based on current technology and state-of-the-art reclamation. Stabilization of the waste disposal area and reclamation of sites disturbed during operation such as the landfill, borrow areas, and abandoned roads will be on-going and continuous as required by state and federal laws and regulations. Borrow areas and maintenance yards used during plant construction have been recontoured and reseeded, and are responding as planned. Therefore, cost estimates provided in this section cover only those areas that will not be stabilized or reclaimed during the operational life of the processing facility.

5.1 DECOMMISSIONING/RECLAMATION COST ESTIMATE

SUMMARY

	TASK DESCRIPTION	ESTIMATED COSTS
A.	Site Decommissioning	$ 887,600
B.	Radiological Survey	13,740
C.	Facility Site Reclamation (includes maintenance costs)	70,304
D.	Access Road Reclamation (includes maintenance costs)	14,067
E.	Tailings Impoundment Area Reclamation (includes maintenance costs)	1,113,135
F.	Inspection for 5 years after closure	37,316
	Subtotal	$2,136,162
	Contingency (15% of subtotal)	320,424
	TOTAL	$2,456,586*

*Cost estimates are based on 1982 dollars.

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C.	Facility Site Reclamation (includes maintenance costs)	70,304
D.	Access Road Reclamation (includes maintenance costs)	14,067
E.	Tailings Impoundment Area Reclamation (includes maintenance costs)	227,480
F.	Inspection for 5 years after closure	37,316
	Subtotal	$1,250,507
	Contingency (15% of subtotal)	187,576
	TOTAL	$1,438,083*

*Cost estimates are based on 1982 dollars.

5.2 DECOMMISSIONING/RECLAMATION COST BREAKDOWN

A. Site Decommissioning

1. Dismantling and Disposal of Non-Salable Items

	Facility	Quantity	Hours	Rate/Hour	Cost
a.	Structures (roofing & siding)	870 tons 93,500 ft.^{2}	13,000	$ 12.00	$156,000
b.	Concrete	4,170 yd.^{3}	8,500	12.00	102,000
c.	Process Equipment (30% burial)	1,335 tons	14,500	18.00	261,000
d.	Piping & Insulation (30% burial)	Lump Sum	6,500	18.00	117,000
e.	Electrical & Instrumentation	Lump Sum	4,500	16.00	72,000
f.	Building Components	28,593 yd.^{3}	2,000	20.00	40,000
g.	Demolition-Other Items		1,500	12.00	18,000
	Subtotal				$766,000
2.	Decontamination Allowance		6,400	12.00	76,800
3.	Contaminated Earth Excavation & Burial	22,585 yd.^{3}*	70	640.00	44,800**
	Total for Site Decommissioning				$887,600

*Assumes removal of soil averaging one foot in depth over the plant site. Soil beneath the ore stockpiles would probably require stripping to 1.5 to 2 feet; other areas, such as under pads, would require little, if any stripping.

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5.2 DECOMMISSIONING/RECLAMATION COST BREAKDOWN

A. Site Decommissioning

1. Dismantling and Disposal of Non-Salable Items

	Facility	Quantity	Hours	Rate/Hour	Cost
a.	Structures (roofing & siding)	870 tons 93,500 ft.^{2}	13,000	$ 12.00	$156,000
b.	Concrete	4,170 yd.^{3}	8,500	12.00	102,000
c.	Process Equipment (30% burial)	1,335 tons	14,500	18.00	261,000
d.	Piping & Insulation (30% burial)	Lump Sum	6,500	18.00	117,000
e.	Electrical & Instrumentation	Lump Sum	4,500	16.00	72,000
f.	Building Components	28,593 yd.^{3}	2,000	20.00	40,000
g.	Demolition-Other Items		1,500	12.00	18,000
	Subtotal				$766,000
2.	Decontamination Allowance		6,400	12.00	76,800
3.	Contaminated Earth Excavation & Burial	22,585 yd.^{3}	70	640.00	44,800
Total for Site Decommissioning					$887,600

** $640.00 per hour includes the rental rates of the following equipment:

2	651 scrapers	@$180.00 an hour =	$360.00
2	D-9 Cats	@$140.00 an hour =	$280.00

TOTAL = $640.00 per hour.

B. Radiological Survey

1.	Analyze 56 soil samples for radium	$ 5,040
2.	Smear samples during decommissioning of equipment and buildings	5,000
3.	56 gamma dose rate samples (corresponding to soil sample locations)	1,000
4.	10 groundwater samples for radionuclites and selected elements (one sample each from 10 locations)	2,000*
5.	Radon flux measurements of clay cap material prior to placing the material	700
	TOTAL	$13,740

*Chemical parameters to be analyzed will be determined from an analysis of samples taken from the tailings pond once mill operations have begun per Table 6.2 Footnote (d) in the FES. Also, the Operations and Training Manual for Plateau Resources Limited's Shootaring Canyon Processing Facility states in Section 10.4.2 No. 6 CCD Underflow, Automatic Sample 1. Purpose: To obtain a representative, uniform, automatic sample for analysis of the soluble and insoluble U_3O_8 loss in the tailings. Additionally, analysis of composite samples will be used to quantify the radiological and chemical effluents in the tailings liquid. Results of these analyses will be used by the environmental department to identify potential groundwater contaminants.

B. Radiological Survey

1.	Analyze 56 soil samples for radium	$ 5,040
2.	Smear samples during decommissioning of equipment and buildings	5,000
3.	56 gamma dose rate samples (corresponding to soil sample locations)	1,000
4.	10 groundwater samples for radionuclites and selected elements (one sample each from 10 locations)	2,000
5.	Radon flux measurements of clay cap material prior to placing the material	700
	TOTAL	$13,740

C. Facility Site Reclamation

1. Process Facility

	Area	Quantity	Cost
a. Cover area with approx. 1 ft. (0.3m) of stockpiled topsoil @ $1.00/ yd.^{3} ($0.7646m^3$)	14 acres	22,587 yd.^{3}	$22,587
$\frac{14 \times 43560 \times 1}{27}$ = 22,587 yd.^{3}			
b. Fertilize and seed @ $1200/acre	14 acres		16,800
Subtotal			$39,387

2. Maintenance & Equipment Storage Yard

a. Cover area with approx. 1 ft. stockpiled topsoil @ $1.00/yd.^{3}	2 acres	3,227 yd.^{3}	$ 3,227
$\frac{2 \times 43560 \times 1}{27}$ = 3,227 yd.^{3}			
b. Fertilize and seed @ $1200/acre	2 acres		$ 2,400
Subtotal			$ 5,627

3. Areal (light contamination)

a. Remove approx. 0.5 ft. to 1 ft. of topsoil @ $1.00/yd.^{3} for burial in tailings impoundment	5 acres	8,067 yd.^{3}	$ 8,067
$\frac{5 \times 43560 \times 1}{27}$ = 8,067 yd.^{3}			
b. Fertilize and seed @ $1200/acre	5 acres		$ 6,000
Subtotal			$14,067

Revised-3/17/82

C. Facility Site Reclamation

1. Process Facility

	Area	Quantity	Cost
a. Cover area with approx. 1 ft. (0.3m) of stock-piled topsoil @ $1.00/ yd.^{3} ($0.7646m^3$)	14 acres	22,587 yd.^{3}	$22,587
$\frac{14 \times 43560 \times 1}{27} = 22,587$ yd.^{3}			
b. Fertilize and seed @ $1200/acre	14 acres		16,800
Subtotal			$39,387

2. Maintenance & Equipment Storage Yard

a. Cover area with approx. 1 ft. stockpiled topsoil @ $1.00/yd.^{3}	2 acres	3,227 yd.^{3}	$ 3,227
$\frac{2 \times 43560 \times 1}{27} = 3,227$ yd.^{3}			
b. Fertilize and seed @ $1200/acre	2 acres		$ 2,400
Subtotal			$ 5,627

3. Areal (light contamination)

a. Cover with approx. 1 ft. stockpiled topsoil @ $1.00/yd.^{3}	5 acres	8,067 yd.^{3}	$ 8,067
$\frac{5 \times 43560 \times 1}{27} = 8,067$ yd.^{3}			
b. Fertilize and seed @ $1200/acre	5 acres		$ 6,000
Subtotal			$14,067

		Area	Quantity	Cost
4.	Topsoil Stockpile Area			
a.	Recontouring	7 acres	Lump Sum	$ 2,823
b.	Fertilize and seed @ $1200/acre	7 acres		8,400
	Subtotal			$11,223
	TOTAL for Site Reclamation - - - - - - - - - - - - - - - - -			$70,304
D.	Access Road Reclamation			
1.	Ripping @ $600/acre	6 acres		3,600
2.	Cover with 1' Stockpiled topsoil @ $1.00/yd.^{3}	2 acres	9,680 yd.^{3}	3,227
	$\frac{3 \times 43560 \times 1}{27}$ = 3,227 yd.^{3}			
3.	Fertilize and seed @ $1200/acre	6 acres		7,200
	TOTAL for Access Road Reclamation- - - - - - - - - - - - - - -			$14,067
E.	Tailings Impoundment Area Reclamation			
1.	Install 6' of clay over the impoundment area and compact @ $3.00/yd.^{3}	29.36 acres	284,205 yd.^{3}	$852,614
	$\frac{29.36 \times 43560 \times 6}{27}$ = 284,205 yd.^{3}			
2.	Install 2' sandy soil material over clay and compact @ $2.00/yd.^{3}	29.36 acres	94,735 yd.^{3}	189,470
	$\frac{29.36 \times 43560 \times 2}{27}$ = 94,735 yd.^{3}			
3.	Install 1' of gravel and rock @ $1.50/yd.^{3}	29.36 acres	47,367 yd.^{3}	71,051
	$\frac{29.36 \times 43560 \times 1}{27}$ = 47,367 yd.^{3}			
	TOTAL Tailings Impoundment Area Reclamation- - - - - - - -			$1,113,135

Revised-3/17/82

		Area	Quantity	Cost
4.	Topsoil Stockpile Area			
	a. Recontouring	7 acres	Lump Sum	$ 2,823
	b. Fertilize and seed @ $1200/acre	7 acres		8,400
	Subtotal			$11,223
	TOTAL for Site Reclamation			$70,304
D.	Access Road Reclamation			
1.	Ripping @ $600/acre	6 acres		3,600
2.	Cover with 1' Stockpiled topsoil @ $1.00/yd.^{3}	2 acres	9,680 yd.^{3}	3,227
	$\frac{3 \times 43560 \times 1}{27}$ = 3,227 yd.^{3}			
3.	Fertilize and seed @ $1200/acre	6 acres		7,200
	TOTAL for Access Road Reclamation			$14,067
E.	Tailings Impoundment Area Reclamation			
1.	Install 6' of clay over the impoundment area and compact @ $3.00/yd.^{3}	6 acres	58,080 yd.^{3}	$174,240
	$\frac{6 \times 43560 \times 6}{27}$ = 58,080 yd.^{3}			
2.	Install 2' sandy soil material over clay and compact @$2.00/yd.^{3}	6 acres	19,360 yd.^{3}	38,720
	$\frac{6 \times 43560 \times 2}{27}$ = 19,360 yd.^{3}			
3.	Install 1' of gravel and rock @ $1.50/yd.^{3}	6 acres	9,680 yd.^{3}	14,520
	$\frac{6 \times 43560 \times 1}{27}$ = 9,680 yd.^{3}			
	TOTAL Tailings Impoundment Area Reclamation			$227,480

F. Inspection for 5 Years After Closure

1.	Four trips/year for 5 years = 20 trips.	
	Twenty trips x 2 days/trip x $500/per diem	= $ 20,000
	$20,000 + 15% overhead and office time	= $ 23,000
2.	Testing	
	Five TLDs @ $11.00 x 4 changes/year x 5 years*	= $ 1,100
	Ten monitoring cups @ 66.00 x 4 changes/year x 5 years*	= $ 13,200
	Initial fee for TLDs is $3.25 x 5 units	$ 16
3.	Total for Inspections	= $ 37,316

* Includes postage and analysis charges.

** Ibid.

APPENDIX A
TAILINGS IMPOUNDMENT

1.0 TAILINGS DISPOSAL SYSTEM

Tailings from the ore processing operation will be discharged to a dammed impoundment located about 500 feet southwest of the plant (See Figures 1 and 2). The impoundment has been designed with a net capacity of about 2600 acre-feet, sufficient to contain the total expected project tailings generated during an operating life of 15 years, based on a plant throughput of 1000 tons of dry ore per day, 365 days per year operation. At the end of 15 years the tailings in the impoundment will cover an area of approximately 70 surface acres. The impoundment will be fenced to exclude livestock.

The tailings management system for the Shootaring Canyon project has been designed to incorporate best available technology, with tailings to be stabilized within a few days to a few weeks of their placement in the impoundment. This stabilization will be accomplished by draining the tailings as they are placed in the impoundment. For this purpose, a drainage system has been installed in the bottom of the impoundment and a prescribed tailings placement procedure will be followed to facilitate the drainage. As a result of this procedure, no deep concentrations of tailings slimes are expected to form within the impoundment; it will therefore be possible to reclaim the tailings disposal area shortly after it is filled to its ultimate level.

A site selection survey (Woodward-Clyde Consultants, June, 1977) was completed to identify locations near the Shootaring Canyon uranium mines best suited for the safe and efficient disposal of tailings and convenient to areas suitable for an ore processing facility. A preliminary design and construction specification (Woodward-Clyde Consultants, May, 1978) was completed for a dam and tailings impoundment facility at a candidate site identified in the earlier study. A third study (Woodward-Clyde Consultants, January, 1978) reviewed alternative tailings disposal systems considered for the project. A supporting document, presenting the results of an assessment of the performance of the tailings disposal system included with the proposed ore processing facility, was

submitted to the NRC in June, 1978. The report included comparative data on costs and performance for the alternative methods of tailings disposal considered for the project. Construction plans and specifications for the tailings disposal dam and impoundment area clay liner, and a final design report, was submitted to the NRC in May, 1979.

Prior to construction of the tailings impoundment, such topsoil as existed within the impoundment area was removed and stockpiled for use in future reclamation activities. After the topsoil was removed, the floor of the impoundment was shaped to remove surface irregularities, unsuitable materials were removed, and the surface compacted; care was taken to ensure that the natural southwesterly slope of the area was maintained. Following the foundation dressing and compaction, selected clay was spread evenly over the impoundment area and compacted to 95 percent Standard Proctor Density with a sheepsfoot compactor. Water was used to wet the clay during the operation to facilitate proper compaction. Total depth of the compacted clay liner is at least 2 feet in all areas. A layer of sandy material was spread over the clay liner promptly after it was placed, to preserve its integrity.

A dam key trench, about 40 feet wide and extending up the abutments above the level of the top of the dam was excavated across the natural drainage outlet from the impoundment basin. A dam about 260 feet wide at the base and 60 feet high was constructed for the first stage. Exterior slopes of the dam are not steeper than two horizontal to one vertical (2:1). The initial structure is expected to serve without raising for the first 6 to 10 years of operations, depending on the performance of the tailings drainage and stabilization system. Materials for constructing the dam were obtained from the vicinity. Adequate quantities of all materials required for additions to the dam and the impoundment area clay liner have been indentified in the locality.

2.0 TAILINGS DISPOSAL MANAGEMENT

Tailings will be transported, in the form of a slurry of about 45-55 percent solids by weight, to the impoundment through a 4-inch diameter high-density polyethlene pipe. The 4-inch pipe is supported with an 18-inch half-round polyethlene pipe, which will contain any potential leakage from the 4-inch pipe and will conduct the leaked material to the impoundment by gravity flow.

The tailings impoundment area has been divided into disposal cells, with the cell dividers constructed mainly of tailings sand (initially, before tailings sand is available, the cell dividers were started using locally available sandy material). The purpose of using cells is to provide interim stabilization, more effecient dewatering, and progressive reclamation of cells. The first cells to be used will be at the upstream end of the impoundment area; a cross-valley berm located about 2000 feet upstream from the dam will mark the downstream limit of these initial cells.

Perforated drain pipes have been installed under the cell dividers, on top of the impoundment's clay liner. These drains connect to a main drain installed essentially along the course of the natural drainage channel traversing the length of the impoundment area. This main drain will in turn discharge to a collection sump located initially at the downstream toe of the cross valley berm. Liquid drained from the tailings will be returned to the plant process circuit by pumping. Some liquid may be used for wetting the exposed tailings surfaces to control wind dispersion of the tailings.

Tailings discharge to the cells will be progressively rotated to all the corners of each cell, and to the various cells in the placement cycle. It is expected that all the five cells would be used in a rotational cycle at any time, with the actual number dependent upon the performance of the tailings drainage system, and the time required to achieve the desired degree of tailings stabilization between placement cycles. Present expectations are that it will be feasible to discharge the entire flow of tailings slurry from a single spigot at one corner of a cell, and that this flow may be continued for a period chosen

to provide efficient cell operation before the discharge is shifted to the lowest corner of the cell that is next in the rotational cycle.

The sand and slime fractions of the tailings will segregate as they are discharged to the cells, with the sand depositing nearer the point of discharge and the slimes flowing to the lowest area within the cell (which will continuously be shifting in location because of the shifting discharge points). The sands, being concentrated near the points of discharge, will be readily accessible for use in progressively raising the tops of the cell dividers. These cell dividers, because they will consist of relatively clean tailings sand, will serve as continuous vertical sand drains discharging into the underlying perforated drain pipes.

At the end of each tailings placement cycle, a relatively large area within the central portion of each cell is expected to be covered with a shallow layer of slimes. These slimes will remain undisturbed until the next placement cycle, and during the intervening period they are expected to stabilize by evaporation and drainage, to the extent that they will not be significantly displaced by the next tailings discharge to the cell. Since each layer of slimes will collect and stabilize in the lowest part of the cell and since the next tailings discharge will be from the lowest corner of that cell, it is expected that each layer of slimes will be largely covered by sand. Ultimately, the central part of each cell will be filled with alternating layers of sand and slimes lying in a helical configuration; at the cell perimeter there will be only tailings sand. This configuration will facilitate drainage and consolidation of the slimes, and will lead to continuous burial of that part of the tailings containing most of the residual radioactivity in the processed ore.

The tailings management plan permits the wide variation in tailings placement procedures needed for developing a method best serving the objectives of the plan. For example, the number of cells in the rotational cycle may be

increased or decreased; the duration of tailings placement in a cell may be varied; and the number of simultaneous points of discharge may be adjusted. It seems likely that these procedures will require seasonal adjustments due to the large local seasonal variations in evaporation rates. A major advantage of the system, if it performs as expected, will be that most of the tailings liquid will be reclaimed for reuse in the process circuit, significantly affecting the amount of fresh water to be consumed by the plant. Since the tailings liquid will be acidic, its recovery will have an important effect on the total acid requirements of the plant.

As previously noted, tailings placement will start at the upstream end of the impoundment basin. The available tailings disposal volume upstream from the initial cross valley berm is sufficient to store the tailings from the first three to four years of plant operation. Since the tailings are expected to be stabilized essentially as they are placed, it will be feasible to fill the initial cells to their ultimate capacity before a second cross valley berm and new cells are put in operation further down the impoundment basin. Similarly, the second set of cells may be filled to their ultimate level before use of the third (and final) set of cells is started. Accordingly, the tailings dam will not require raising until tailings placement is underway in the cells abutting the dam.

Since the tailings are expected to stabilize essentially as they are placed, and since the initial cells will be filled to their ultimate capacity before the tailings placement operation is shifted to the next set of cells, it should be feasible to cap the tailings in the initial cells within three to four years of the onset of plant operations. As soon as the tailings are capped, the risks of tailings dispersion by wind is effectively eliminated. Therefore, progressive reclamation of the impoundment area throughout the operating life of the plant is planned.

APPENDIX B

SHOOTARING CANYON PROCESSING FACILITY
TOPSOIL STOCKPILE STABILIZATION

APPENDIX B
SHOOTARING CANYON PROCESSING FACILITY
TOPSOIL STOCKPILE STABILIZATION

Soil stabilization can be effected by mechanical or biological means or a combination of these two. The severe climatological and edaphic factors present in the mill site area disallow depending on natural revegetation to achieve a productive, protective ground cover over the short term. Purely mechanical means such as listed contour furrows, application of an asphalt cap, construction of windbreaks, etc., are not economically feasible. An asphalt cap that completely covers the stockpile is the only mechanical method that would not require annual maintenance. However, its initial cost and the undesirable effects it would have on the soil when it is reused in twenty years precludes its consideration. An approach that combines both the biological and mechanical methods of stabilization is therefore advisable.

Temporary mechanical treatments give short-term (6 months - 5 years) defense against soil and water erosion at a reasonable cost while allowing vegetation an opportunity to become established and form a protective cover. The suggested management of the overburden stockpile is as follows:

a) Surface disturbance to the area adjacent to the stockpile will be kept to the minimum to protect existing vegetation.
b) Topsoil will be stored so the volume of soil above the restrictive layer of sandstone or clay is sufficient to sustain the species chosen for revegetation. Inasmuch as possible, the soil overburden will be spread to provide a soil profile conducive to growth of planted species.
c) The stockpile will cover the minimum acreage possible, and it will be graded in such a way as to reduce its visual impact.
d) The earthmoving contractor will be instructed to build the stockpile as follows:
    1) If feasible, a soil profile shall be reconstructed.

2) The soil is to be shaped to a gentle southwest facing slope.* Rough grading of the top should produce an uneven surface with some low spots that will serve as water catchment basins. Shaping the surface to enhance water harvesting will increase chances of revegetation.

3) Side slopes will generally not be steeper than a 5:1 slope. In no instance should any slope be greater than 4:1 unless suitable temporary erosion control measures are taken.

4) Compaction of the stockpile surface is to be avoided whenever possible, and areas that are compacted will be chiseled prior to planting. Heavy equipment will not be allowed on the stockpile when it is wet.

e) Revegetation

1) Temporary measures to decrease wind and water erosion in the interim period before planting may be necessary. A network of snow fences perpendicular to the prevailing winds may be installed to temporarily reduce the effects of wind erosion. The fences will be removed as soon as vegetative ground cover is formed. Straw or hay crimped into the topsoil or other temporary mulches may be used.

2) Seedbed preparation and planting will be completed in the fall immediately after final earthmoving.

3) Non-toxic adapted species will be used to revegetate the topsoil stockpile and the borrow pits. See Attachment A for a list of the species to be planted. The seed will be drilled or broadcast. Seed shall not be sown during windy weather or when the ground is frozen, wet, or otherwise unsuitable for seeding, nor will hydroseeding be used.

*Although the heat balance of a northwest facing slope is more favorable in arid regions, this slope must be in the opposite direction to facilitate surface water drainage.

4) If irrigation water is available from the mill, it will be used until vegetation density is sufficient to stabilize the soil and set the direction of community succession.
5) Rodent and lagomorph control will not be used initially. However, should control be needed, E. P. A. approved methods will be used.

Studies are being conducted by Plateau personnel to determine which mulch and tacking agents will yield the greatest stability. Preliminary data suggest that asphalt emulsions are not conducive to plant growth in this area, but Terra-Tac, Soil Gard, Erosionet, and Celtite 81-03 Polybind Acrylic DLR are showing some promise when used with an organic mulch. If hay or straw are used, they will be applied at a rate of two tons per acre and crimped into the soil with a modified sheepsfoot roller, mulch tiller, or a weighted farm disc harrow. Serious consideration is being given to a gravel mulch that would be applied in a thin layer that would reduce wind and water erosion, but allow vegetation to become established.

Soil reports that will be taken after that final grading will be used to determine if fertilizer is needed.

After completion of seeding, the area will be revisited on a regular schedule by reclamation personnel who will determine what additional practices, if any, will be needed. Additional maintenance procedures will be instituted immmediately, as required.

One acre (0.4ha) or less of the topsoil stockpile may be used as a test plot site. The test plots will be designed to yield data on seed mixes, mulches, and cultural practices that may be used when the plant site is permanently abandoned.

ATTACHMENT A

Species to be Planted on Temporary Topsoil Stockpile*

Scientific Name	Common Name
Grasses	
Agropyron sibericum	Siberian wheatgrass
Elymus junceus	Russian wildrye
Oryzopsis hymenoides	Indian ricegrass
Sporobolus cryptandrus	Sand dropseed
Shrubs	
Atriplex canescens	Fourwing saltbush
Ceratoides lanata	Winterfat
Chrysothamnus nauseosus	Rubber rabbitbrush
Ephedra torreyana	Torrey Mormon tea

*The use of the above listed plants is subject to their commercial availability. Other species with similar characteristics and tolerances may be substituted.

APPENDIX C

LETTER FROM ROSS A. SCARANO TO PLATEAU

APPENDIX - C

FEB 11 1981

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

FEB 6 1981

Docket No. 40-8698
SUA-1371

Plateau Resources Limited
ATTN: Mr. William Head
Manager of Operations
772 Horizon Drive
Grand Junction, CO 81501

Gentlemen:

As discussed previously with your staff during numerous meetings and telephone conversations, our examination of your "Mill Site Reclamation Contract" with the State of Utah (Department of Natural Resources Board of Oil, Gas and Mining), which was submitted in order to provide surety arrangements for future decommissioning and reclamation of the Shootering Canyon Mill Site, indicates that it is unacceptable. This contractual mechanism does not provide adequate assurance that sufficient funds will be available to perform reclamation and decommissioning upon termination of milling activities. Therefore, it is necessary that you provide for another surety, approved by NRC, prior to the start of your milling operations.

A number of acceptable surety mechanisms are listed in Chapter 14 of the Final Generic Environmental Impact Statement on Uranium Milling and include the following: cash deposits, surety bonds, certificates of deposit, deposits of government securities and letters of credit. As previously discussed between our staffs, we will not require the surety to be placed with the Utah Department of Natural Resources. In addition, it is necessary that the amount of the surety be supported by a breakdown of the various costs for the approved plan for site decommissioning and tailings reclamation specified in License Condition No. 38. These costs must be in terms of 1980 dollars and include the following:

1) A list of each activity, cost estimates, and the basis for the costs for each activity should an outside contractor be required to perform the activity. (This would include equipment cost, a reasonable profit cost, etc.).

2) Estimated cost for a one-time radiological survey to determine compliance following site decommissioning and decontamination.

FEB 6 1981

3) The one-time charge designed to cover the cost of long-term surveillance ($308,000 - 1980 dollars), required to be deposited prior to termination of operations.

4) Once all of the items necessary have been considered in the cost estimate, inflation, which will likely occur over the next year of operation (based on an average of the past three years), must be factored in to arrive at the total amount of the surety.

In an instance where a bond is used for the surety, you should submit to the U. S. NRC, Washington, D. C. 20555, a copy of a bond secured from any of the companies listed by the Internal Revenue Service in Circular 570 entitled, "Surety Companies Acceptable on Federal Bonds" (current issue 38086). The bond shall be based on cost estimates for all reclamation and decommissioning activities.

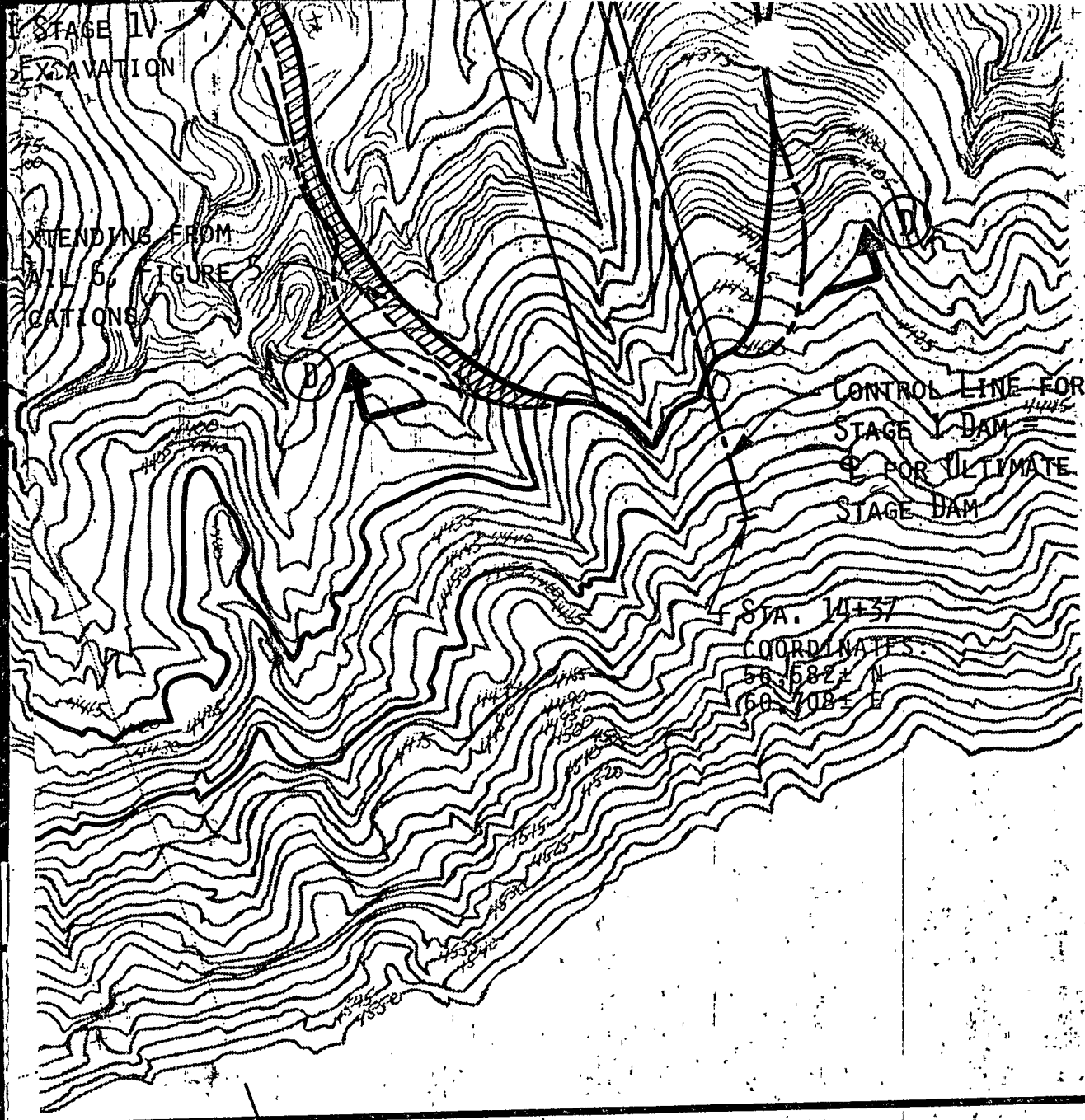
As previously discussed we would like to again point out that surety arrangements approved by NRC must be in place prior to the initiation of operations.

If you have any questions regarding this matter, please contact John Linehan of my staff at (301) 427-4103.

Sincerely,

Ross A. Scarano, Chief
Uranium Recovery Licensing Branch
Division of Waste Management

cc: Ron Daniels, State of Utah



IMPOUNDMENT AREA PLAN VIEW

PLATEAU RESOURCES LIMITED

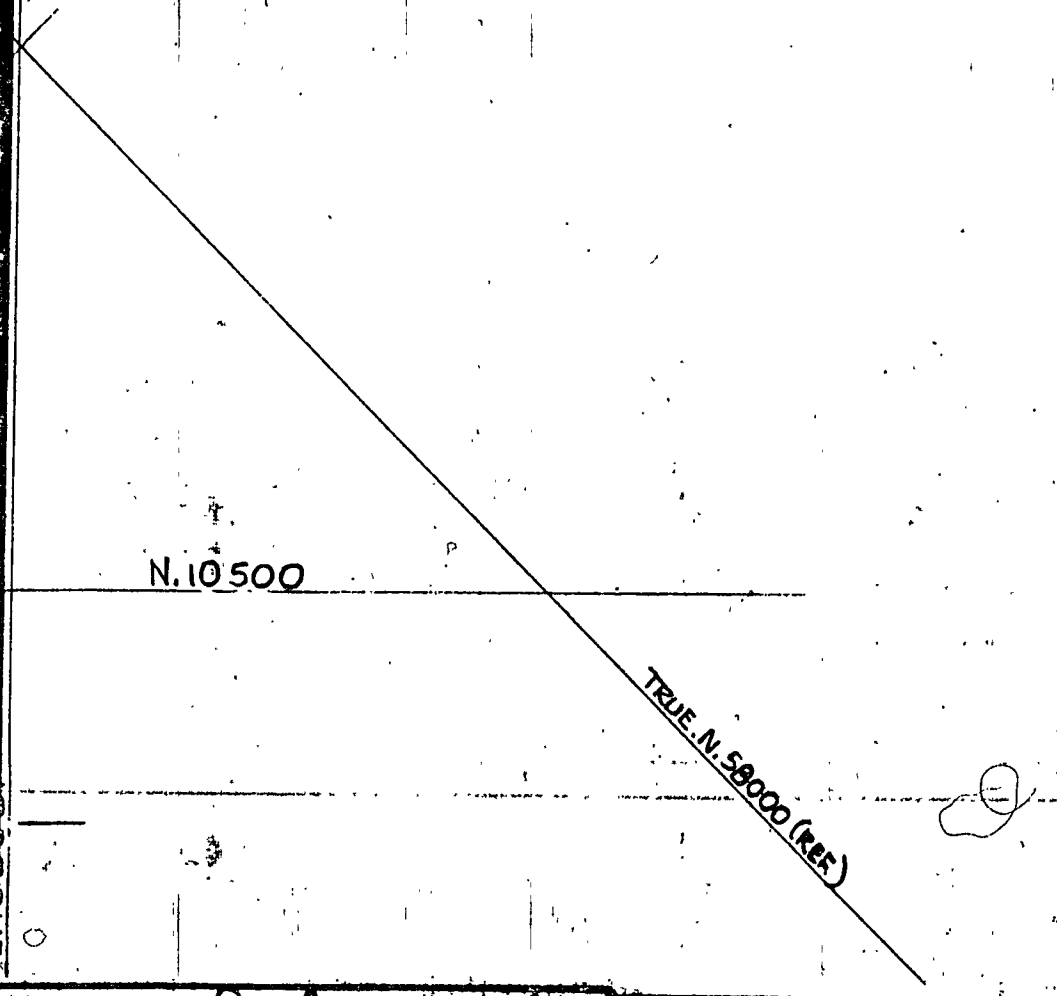
SHOOTERING CANYON URANIUM PROJECT

Garfield County, Utah

Project No. 60255J

Woodward-Clyde Consultants

Figure 1



AREA
800

800-4605

John Beesley for JHBrown
APPROVED
FOR CONSTRUCTION 5/17/79

JOB 435

Stephen Morrison
5/17/79
STATE OF UTAH

DRAWING TITLE

TAILINGS
PIPING
LINE ROUTING
PLAN

mountain states engineers
TUCSON ARIZONA

SCALE 1"=100'-0"

FIG. 2

JOB NO. 435

5-17-79

General Office: 772 Horizon Drive, Grand Junction, CO 81501 (303) 245-5460
Corporate Office: 212 West Michigan Avenue, Jackson, MI 49201 (517) 788-1942
Registered Office: 136 South Main, Salt Lake City, UT 84101 (801) 534-0734

April 12, 1983

U. S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, Maryland 20910

Attention: Mr. R. Dale Smith

Gentlemen:

Reference: Revision to Interim Surety Estimates for Decommissioning and Reclamation, April 1983

An error was noted in the above referenced document after it was mailed. Please replace page one of the attachment to my April 11, 1983 letter with the attached, revised page one. Also insert the attached page entitled List of Revisions after the title page.

Sincerely,

Fred W. Gerdeman

Fred W. Gerdeman

FWG/ksd

Enc.

cc: Mr. R. L. Heiks
Mr. B. O. Fisher
Mr. U. K. Gupta

LIST OF REVISIONS

Revision Date	Remove Old Pages	Insert New Pages
4/12/83	N/A	List of Revisions
4/12/83	1	1

1.0 Introduction

The purpose of this submittal is to address the requirements of the third paragraph of Condition 39 of Source Material License SUA-1371 (Amendment No. 6) which reads as follows, "Prior to April 13, 1983, the licensee shall submit proposed surety arrangement revisions to include reclamation costs of Cell Nos. 4 and 5. The proposed revised surety arrangements shall also address the need for adjustment of existing surety arrangements to reflect the effects of inflation." Plateau Resources Limited's Shootaring Canyon Uranium Processing Facility commenced start-up operation on April 13, 1982 and began normal operation on June 1, 1982. On August 18, 1982 the Company temporarily suspended operations, and spent several weeks in recovering the yellowcake that was in the plant circuit and in clean-up and maintenance work.

Since that time there have been no milling operations at the Processing Facility and none are planned until late 1984. A small crew of plant employees has been kept to maintain the facility. The facility's analytical laboratory is continuing to run ore samples for the Tony M mine, and tailings and contaminated equipment from the Hydro-Jet facility (SUA-1013), which is being decommissioned, are being disposed of in the tailings impoundment.

After completion of the decommissioning of the Hydro-Jet facility the estimated total amount of material in the tailings impoundment would not exceed the total volume available in Cell Nos. 1, 2, and 3, and the surface acreage covered by tailings and other contaminated material will be substantially less than the 29.36 acre figure that was used as the basis for estimating the present surety amount. Therefore, Cell Nos. 4 and 5 will not be needed in 1983 or 1984 as was anticipated earlier.

Due to the reduction in volume and surface area of the tailings to far below the amount for which surety arrangements were made and Plateau's plans for not restarting the Processing Facility until late 1984, Plateau proposes that the surety amount be reduced from $1,875,000 to $1,759,000. This amount provides for reclamation of the impoundment as described in this report, and increases (for inflation) the other decommissioning and reclamation cost estimates that were provided in Plateau's "Decommissioning and Reclamation Plan" which was submitted on January 7, 1982 and revised March 17, 1982. As discussed in the aforementioned plan and this proposal $1,759,000 should provide sufficient surety to cover the projected costs of decommissioning and reclamation of the Processing Facility until it begins operation again. Prior to restarting the facility Plateau will notify the U. S. Nuclear Regulatory Commission and, if conditions extant at that time warrant it, increase the surety amount to reflect the Company's plans and proposed level of operation.